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CURRENT LITERATURE

BOOK REVIEWS

Two ecological monographs

Climatic adaptations.—Supported by a grant from the Royal Prussian Academy of Sciences in Berlin, Dr. CARL HOLTERMANN was able to spend some time at the botanical gardens in Peradeniya and Buitenzorg, where he carried on investigations upon the anatomy and physiology of tropical plants, returning to Berlin with a very rich collection of alcoholic material, only part of which has yet been investigated. The first fruits of these investigations form a bulky volume (which might easily have been made less imposing and more convenient) upon the influence of climate on the structure of plants.¹

The work is dedicated to SCHWENDENER (in honor of the fiftieth anniversary of his doctorate), and the author naturally looks upon plants from the same view-point as the *Meister*—"dass im inneren Bau der Pflanzen eine weitgehende Zweckmässigkeit herrscht, dass Bau und Funktion bis in die kleinsten Einzelheiten in Harmonie stehen."

In the first section, on the transpiration of tropical plants, HOLTERMANN shows that both HABERLANDT and GILTAY are right in certain points. The daily maximum value of transpiration is very different in different regions; in all there are certain periods, lasting from four or five hours to one or two days, in which transpiration is so extremely vigorous that the plants suffer for lack of water. As compared with European countries, the total transpiration in 24 hours is less; in the middle of the day, however, it is often decidedly greater in the moist tropics, values being obtained which are not reached even in the hottest days in Berlin; yet these maxima usually last only a few hours. In rainy weather, for days together transpiration ceases entirely. This, as HOLTERMANN points out, is not surprising to pupils of SCHWENDENER, who for more than a generation has treated transpiration in his lectures as a necessary physical process, which indeed induces physiological consequences, but is no indispensable function. The wonderful vegetation of those regions where the rains for months at a time are continuous, or are at most only replaced by a dense fog, speaks strongly against the prevalent view of evaporation as a function; and so do HOLTERMANN's experiments with *Impatiens*, which grows well in saturated air.

The second section, on tropical vegetation zones, is devoted to showing how the members of the various plant societies show like anatomical adaptations to

¹ HOLTERMANN, CARL., *Der Einfluss des Klimas auf den Bau der Pflanzengewebe. Anatomisch-physiologische Untersuchungen in den Tropen.* Imp. 8vo. pp. viii + 247. *figs.* 7. *pls.* 16. Leipzig: Wilhelm Engelmann. 1907. *M* 12.

the climate. He directs attention especially to the water-storing tissue, which he declares to be no xerophytic character (i. e., one that serves as an adaptation to a long dry period), but to have its relation to the transpiration of plants that have only to endure short dry periods. This tissue is almost confined to leaves of tropical and subtropical regions, where by the frequent rains and by the dews, which are heavy even in the dry periods, it can daily be refilled, quite independently of the roots. This refilling HOLTERMANN claims to have established experimentally; but the report is not convincing, particularly as this process is alleged to take place through the epidermis. If water can come in so, it can go out so; and the plant would be the gainer only when the period of evaporation was shorter than the period of absorption.

The third section discusses the leaf fall in the tropics. This, HOLTERMANN holds, is dependent on internal conditions which become active under the influence of climatic factors. Leaves which fall off at the beginning of a dry period are not built to withstand drought; and even if the fall be delayed by favorable conditions, it is only delayed, abscission having become a hereditary peculiarity.

The formation of growth zones is the fourth topic. The author undertakes to show that the formation of zones in secondary wood is incited by climatic factors, acting upon an inherent capacity for differentiation, which, arising originally by direct adaptation, has become heritably fixed. Just how these external factors act, he thinks, will always remain a problem.

The last section, on direct adaptation, deals with water-storing tissue, gutter-pointed and emarginate leaves, dwarfing, etc., as "caused" by definite external conditions. Such new characters, called out at first by the release of latent powers, may become fixed and heritable, just as leaf fall and growth rings, or under other conditions may again disappear.

The book is full of interesting observations, which are unfortunately not easily accessible for lack of an index.—C. R. B.

Ecology of West Australia.—The series of monographs on plant geography² has received a notable addition in the seventh volume, dealing with the flora of southwestern Australia,³ by Dr. DIELS. His thorough knowledge of the herbarium material from this and similar regions, and his wide acquaintance with plant distribution made him able to plan and execute in the most profitable way the journey which he undertook in 1900–1902, in company with Dr. PFITZER, with the support of the Humboldt fund of the Royal Prussian Academy of Sciences.

The systematic results have already appeared, in collaboration with PFITZER, in ENGLER'S *Botanische Jahrbücher*. In this volume we have first, by way of

² ENGLER, A., und DRUDE, O., Die Vegetation der Erde. Sammlung pflanzen-geographische Monographien. Leipzig: Wilhelm Engelmann. 1896—.

³ DIELS, L., Die Pflanzenwelt von West Australien südlich des Wendekreises. Imp. 8vo. pp. xii + 413. 1 map, figs. 82, pls. 34. Leipzig: Wilhelm Engelmann. 1906. M 36, geb. 37.50 (subs. price M 24, bound 25.50).